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in Psychology
and Education**

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Statistical Analysis in Psychology and Education

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Preface

The object of this book, as of the 1959 edition, is to introduce students and research workers in psychology and education to the concepts and applications of statistics. Emphasis is placed on the analysis and interpretation of data resulting from the conduct of experiments. Students and investigators in experimental medicine, psychiatry, sociology, and other disciplines may also find the book useful.

This book may be used as a text for either a one-semester or a full-year course in statistics. When it is used as a text for a one-semester course the instructor may exercise a choice in the selection of material. The selection will usually include most of Chaps. 1 to 13 and possibly sections in some of the remaining chapters. Different instructors hold divergent views with regard to the content of introductory courses in statistics. This book has been designed to permit the instructor some freedom of choice in the selection of course content.

I have attempted not only to introduce the student to the practical technology of statistics but also to explain in a nonmathematical and frequently intuitive way the nature of statistical ideas. This is not always easy. Obviously, the extent to which an understanding of statistics can be communicated without some mathematical knowledge is limited. Skill in high school or freshman algebra will prove most helpful to the student.

The writing of a book of this type demands numerous compromises between a tidy logical arrangement of material, sound pedagogy, and common usage, which are not always compatible. The desire for completeness has led to the inclusion of occasional sections which perhaps should not be included in an introductory text. The instructor can readily identify these sections and omit them if he chooses.

In preparing the second edition of this book many changes have been made, some important and some trivial; also a number of new chapters have been added. The material in the two chapters of the first edition, "Essential Ideas of Sampling" and "Tests of Significance,"

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has been replaced by four shorter chapters, "Sampling," "Estimation," "Tests of Significance: Means," and "Tests of Significance: Other Statistics." New chapters have been added on the "Analysis of Covariance" and "Trend Analysis." A chapter on "The Structure and Planning of Experiments" has been included; it is intended to provide the student with a simple nonmathematical introduction to experimental design as a preliminary to the study of the analysis of variance. Other less important additions relate to multiple comparisons, directional versus nondirectional tests, and nonparametric methods of trend analysis.

In the present edition we have chosen to define initially the sample variance using $N - 1$, and not N as in the first edition. While this has advantages in some situations, it occasionally leads to difficulty in problems of correlation. In a few instances a definition using N has been used for convenience and simplicity. The difference between the definition of the sample variance using $N - 1$ and that using N is made clear at an early stage and should present no difficulty to the student.

The exercise material in the second edition has been expanded and, I hope, improved.

The usefulness of this book is enhanced by the kindness of authors and publishers who have permitted the adaptation and reproduction of tables and other materials published originally by them. I should like to express my gratitude to Francis G. Cornell, Allen L. Edwards, R. W. B. Jackson, M. G. Kendall, John F. Kenny, Don Lewis, Quinn McNemar, Edwin G. Olds, George W. Snedecor, Herbert Sorenson, James E. Wert, and Frank Wilcoxon; and to the Scottish Council for Research in Education; the University of London Press Ltd.; Charles Griffin & Company, Ltd.; Prentice-Hall, Inc.; John Wiley & Sons, Inc.; D. Van Nostrand Company, Inc.; Rinehart & Company, Inc.; Iowa State College Press; and the *Annals of Mathematical Statistics*. I am indebted to Messrs. Oliver and Boyd, Ltd., Edinburgh, for permission to reprint Tables III, IV, and VI of their book *Statistical Tables for Biological, Agricultural, and Medical Research*.

I should like to express here my indebtedness to the late Sir Godfrey H. Thomson and to W. G. Emmett and D. N. Lawley, all of the University of Edinburgh. These three are responsible for my persisting interest in the applications of statistical method to psychological problems. In particular, I should like to express my gratitude to Lady Thomson for permission to reproduce certain tables from Sir Godfrey's work.

This book has benefited greatly by many constructive criticisms and suggestions on the manuscript from Julian C. Stanley of the University of Wisconsin and Lyle Jones of the University of North Carolina.

George A. Ferguson

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